The Chickasaw Nation

Energy Efficiency through Lighting Upgrades

Final Report

2-26-2013

Table of Contents

Executive Summary

A cumulative energy reduction of more than 30% was achieved by upgrading lighting fixtures, ballast and bulbs in the businesses operated by the Chickasaw Nation. These facilities include the three largest casinos operated by the Nation, WinStar World Casino located in Thackerville, Oklahoma, Love county in which measures over 400,000 square feet and has an average of $340,000 electric expenditure per month: Riverwind Casino located in Goldsby, Oklahoma, McClain county measures 250,058 square feet and has a monthly electric charge of $154,765: Newcastle Gaming Center located in Newcastle Oklahoma, McClain county measures 21,073 square feet and has an average charge of $45,100 per month. The potential for energy reduction and savings is greatest at these locations and was the determining factor in being chosen for this project. In addition to the big three, 14 other smaller to mid-sized casinos and retail stores have been included in this project to obtain the greatest reduction in energy usage.

Lighting upgrades were performed changing out old less efficient bulbs and ballast to the newest most energy efficient replacements. Before this grant many tribal facilities still used the nigh energy consuming T-12 bulbs but now have been changed to the T8 or the T5 bulbs which has reduced energy consumption by half per fixture. It is estimated that a total of $175,000 is now being saved per year which is approximately 208,260 kilowatts annually. In addition to the monetary savings, this grant has also provided a sense of stewardship to all that have been a part.

The primary goal of this project was to reduce energy consumption of CNDC tribally operated retail and casino operations including the three largest tribal casinos for a cumulative impact of at least a 30% reduction and an indirect goal was to increase awareness of employees and citizens. The grant was a success and both the reduction was achieved as well as the educational component. An atmosphere of environmental stewardship and responsibility was also created throughout the Division of Commerce.

The Chickasaw Nation's mission is to "Improve the Lives of Chickasaw People" which is fulfilled by conserving natural resources for future generations. Being proactive in all areas of tribal affairs not limited to only business related areas but also environmental aspects is a short and long term goal of the Nation. Chickasaw people have culturally been concerned about environmental practices and are once again placing these objectives as high

priority. Not only energy reduction is a long term objective of the Nation but also energy generation through wind and solar power is being researched. This grant was a first step in the right direction and has proven to many that green initiatives are beneficial and worth the time and money spent.

Project Overview

The primary goal of this grant was to upgrade outdated less energy efficient equipment to the most energy efficient option. This was achieved by replacing incandescents with compact fluorescents, neon with LED and T-12s with T-8s or T-5s. All of these measures taken add up to a great savings and decreased carbon footprint. Along with the hands on installations, the grant also provided an educational and outreach opportunity. Each of the Chickasaw Nation Head Start complexes was visited to share the knowledge of how changing a light bulb can have great impacts on both utility bills and the environment. Numerous emails were received from parents of the head start students stating how the children were encouraging them to buy better bulbs to help save money and the planet. Below is a picture of the talks given at the Ada Head Start.

The biggest area of opportunity came with the three largest tribal casinos. Of the three casinos chosen for this project, Winstar World Casino is the biggest energy consumer. A lighting audit was done in 2007 and in 2010 which revealed that an annual savings of $19,000 plus could be captured. By implementing the Energy Efficiency Lighting Upgrade project, thousands of dollars and kWhs will be saved annually due to the funds provided by the grant.

Riverwind which is the second largest casino chosen for the project, is also the newest. It was constructed in 2006 and has the potential to save $25,700 annually. A lighting audit was performed in 2007 in which thousands of bulbs were found to light this casino alone. Riverwind was upgraded with energy efficient bulbs and has seen a 30% reduction in utility bills and energy usage.

Newcastle Gaming Center is one of the oldest casinos within the tribe. In 2011, Newcastle underwent an expansion that increased its size by 30% which makes it more difficult to calculate actual savings.

Lazer Zone Family Fun Center received both an interior and exterior change out from neon to LED. The old neons were creating a tremendous energy drain as well as a fire hazard. With the main customer being children, Lazer Zone was in great need of an upgrade for multiple reasons. Old neon border lights and neon signage was replaced with energy efficient LEDs and have not only saved energy but also has given the facility a new look and feel. Many compliments have been received which has provided the opportunity to share the energy efficiency story as well.

Due to shipping hurdles and timelines, the grant was extended six months to allow successful completion of all projects.

Objectives

The effort to become more green and environmentally friendly is now steps closer for the Chickasaw Nation. This grant has provided numerous benefits and will continue to do so in the future. Below is a list of objectives planned and achieved buy with this grant.

Grant Objectives, Outcomes and Milestones

Period	Objective	Measure	Costs	Outcome
1st Quarter, Year 1	Purchase Bulbs, Ballasts and fixtures for first three facilities to be changed out as well as LED system for Lazer Zone	Inventory of purchased materials		Inventory received
1ST Quarter, 1st Year	Implement changes to datastream to include new lighting options for order	Products listed in datastream		Products available for purchase
1st quarter, Year 1	Quarterly report	Report		Report sent to DOE
2nd quarter, Year 1	Installation of materials for first three facilities (1-3) and Lazer Zone	Completion of installs		Change outs complete
2nd quarter, Year 1	Quarterly Reports	Report		Report to DOE
3rd quarter, Year 1	Purchase of materials for next five facilities (4-8)	Inventory of purchased materials		Inventory received
3rd quarter, Year 1	CNDCenergy Info sessions with Headstart in Ada	Number of students		Updates included in quarterly report
3rd quarter, Year 1	Quarterly Report	Report		Report to DOE
4th	Installation of	Completion		Change outs complete

quarter, Year 1	materials for five facilities (9-13)	of installs		
Year end Report	Annual Report with to date energy savings	Report		Report to DOE
1st quarter, Year 2	Purchase of next five facilities materials	Inventory of materials		Inventory received
1st quarter, Year 2	Quarterly Report	Report		Report to DOE
2nd quarter, Year 2	Installation of materials (13-18)	Completion of installs		Change outs complete
2nd quarter, Year 2	Purchase of next five facilities materials	Inventory of materials		Inventory received
2nd quarter, Year 2	Info sessions for Head Starts in Tishomingo, Ardmore and Sulphur	Number of students		Summaries included in quarterly report
2nd quarter, Year 2	Installation of materials (19-23)	Completion of installs		Change outs complete
3rd quarter, Year 2	Purchase of materials for (24-28)	Inventory of materials		Inventory received
3rd quarter, Year 2	Installation of materials (24-28)	Completion of installs		Change outs complete

3rd quarter, Year 2	Quarterly Report	Report		Sent to DOE
4th quarter, Year 2	Purchase of materials (28-32)	Inventory of materials		Inventory received
4th quarter, Year 2	Installation of materials (28-32)	Completion of installs		Change outs complete
4th quarter, Year 2	Info sessions at Head Starts in	Number of students		Summaries in annual report
4th quarter, Year 2	Annual report to include energy savings and objective completion	Report		Sent to DOE

Activities Performed

This project was implemented by coordinating with facility managers, regional managers, maintenance managers and frontline maintenance personnel to incorporate new lighting in CNDC facilities. Procurement was brought into the project to revise the current datastream network which is the purchasing process to include all energy efficient lighting upgrade products. This helped to streamline the ordering of the new products.

The greatest environmental impact of the DOE project was the reduction of the carbon footprint of the Chickasaw Nation. A 30% reduction was seen in the energy usage for lighting which lowered energy consumption as well as emissions. The standard incandescent bulb loses about 90% of its input energy to heat. Therefore, changing out incandescent bulbs is saving money and electricity used to cool the tribe's facilities. Old magnetic ballast was upgraded to newer electronic ballast which is much safer and greener.

If energy-efficient lighting was installed everywhere it was profitable, the US EPA estimates that electric use for lighting would be cut by 10% and the following annual pollution reductions would result:

- Reduce annual carbon dioxide emissions by 202 million metric tons which is the equivalent of taking 15 million cars off the road.
- Reduce more than 1.3 million metric tons of sulfur dioxide, which contributes to acid rain.
- Reduce 600,000 metric tons of nitrogen oxides, which contribute to smog.

Lighting contributes to air pollution and the Nation through this grant has taken steps to reduce our impact. Each day the local power plant will burn coal, oil, or natural gas to generate electricity for lighting systems, as well as other electrical needs. While burning, fossil fuels produce an instantaneous supply of electricity and generate air pollutants.

Air pollutants cause global warming, acid rain, and smog and below are reasons why this grant was so vital to the Chickasaw Nation:

CO2 (Carbon Dioxide) - Causes global warming

SO2 (Sulfur Dioxide) - Causes acid rain

NOX (Nitrogen Oxide) - Causes both acid rain and smog

Benefits seen from the new energy efficient lighting:

- Cuts costs by 30 to 50 percent.
- Improves light levels.
- Lasts three times as long, -- 36,000 hours compared to 12,000 hours.
- Light levels have been increased and will lose no more than 10% output over their entire life.
- Task lighting is increased, which improves product quality, morale, and safety.
- After a power outage, light levels return to normal immediately - improving productivity and safety.
- New fixtures require less maintenance and have a five-year warranty.
- New fixtures improve environmental impact and do not require costly haz-mat disposal.
- On-off controls will reduce energy waste further by dimming or turning off lights in unoccupied areas automatically.

In addition to the maintenance and energy savings that come from lighting upgrades, CNDC has also enjoyed the following benefits:

- Higher quality light (better color rendering, less flicker),
- Longer equipment light,
- Less cooling due to less heat from lighting
- Better power factor, and
- Improved environmental image.

An additional environmental benefit to using CFL bulbs includes the reduction of Mercury exposure. Mercury is a toxic metal associated with contamination of water, fish, and food supplies, and can lead to adverse health affects. A CFL bulb generally contains an average of 5 mg of mercury (about one-fifth of that found in the average watch battery, and less than 1/100th of the mercury found in an amalgam dental filling). A power plant will emit 10mg of mercury to produce the electricity to run an incandescent bulb compared to only 2.4mg of mercury to run a CFL for the same time. The net benefit of using the more energy efficient lamp is positive for both the Nation and the environment.

Activities performed include changing out inefficient lighting to more efficient lighting and educational programs. Activities include but are not limited to the following:

Facility Upgrades					
FACILITY		**BUDGET**	**ACTUAL**	**VARIANCE**	**Project Activity**
Lazer Zone - Outside		$ 27,750.00	$ 30,650.00		Neon to LED
Lazer zone - inside		$ 25,000.00	$ 29,375.00		Neon to LED
Abbott Miller		$ 565.00	$ 29,908.32	$ (29,343.32)	T-12 to T-5
Ada West Casino		$ 1,053.00	$ 553.60	$ 499.40	T-12 to T-5
Chisholm Trail		$ 3,004.00	$ 2,644.46	$ 359.54	Incandescent to CFL
Davis TV		$ 2,879.00	$ 844.40	$ 2,034.60	Incandescent to LED
INN at Davis		$	$ 1,080.21	$ 3,554.79	Incandescent

		4,635.00			to LED
Gold Mnt		$ 1,041.00	$ 1,216.93	$ (175.93)	T-12 to T-5
Ard Tob 1		$ 468.00	$ 166.77	$ 301.23	T-12 to T-5
Ard Tob 2		$ 343.00	$ 312.51	$ 30.49	T-12 to T-5
Goldsby		$ 6,783.00	$ 4,032.51	$ 2,750.49	Incandescent to LED
Kingston		$ 1,865.00	$ 1,269.62	$ 595.38	T-12 to T-5
Madill Casino		$ 2,646.00	$ 2,759.63	$ (113.63)	Neon to LED
Madill outside		$ 18,000.00	$ 22,233.20	$ (4,233.20)	Neon to LED
Riverwind		$ 21,466.00	$ 22,000.00	$ (534.00)	
Newcastle		$ 9,153.00	$ 7,500.00	$ 1,653.00	Incandescent to LED
Wilson Casino		$ 434.00	$ 675.00	$ (241.00)	T12 to T-5
Winstar		$ 14,908.00	$ 10,626.00	$ 4,282.00	MR-16 to LED

Conclusions and Recommendations

In both financial terms and communication terms, the DOE grant was a success. Many employees from various departments in addition to the scheduled education events, learned of how they too could become greener and save money at home. The benefits received will last long after the grant period has expired. A younger generation has been introduced to energy conservation and had inspired their parents to make positive changes. The financial benefits and cost savings will last for years to come as well. Not only has the grant provided a pilot program for some of the General Managers to watch and decide whether it is beneficial, it also has proven to them that green measures are not only cost effective but will actually allow for cost reduction.

With the results achieved through the grant, the tribal Environmental, Health and Safety department is equipped with real world instances where

taking steps towards sustainability has worked. This tool will be used to help convince other tribal business and departments to join the cause and become more green.

Lessons Learned

The greatest lesson learned throughout this process was that it takes more than just one department to be successful. Multiple departments and employees made this grant a success. Although the project seemed simple enough, in reality it was more difficult. With the Chickasaw Nation ever expanding its businesses, it was difficult to schedule installations at times that did not interfere with tribal business. After a few attempts, a better process was developed and the project thrived soon after.

Another lesson learned was that people want to become involved in creating a better future but not all know how. Most everyone has heard commercials on television and has seen green products in stores but without a knowledge base of how or why, they did not participate. This grant has given them the opportunity to make a difference and they have. The cumulative impacts of the Chickasaw Nation efforts and the individual efforts have made a priceless and immeasurable positive impact on our planet.